

[0015] It is yet another object to have a cathode material used for an electron beam device that is not highly fragile and has higher adhesive strength.

[0016] It is still yet another object to have a cathode material that has an improved lifetime and increased emission power while not increasing production cost and still having ease of manufacture.

[0017] In order to achieve the above objectives, the invention provides a cathode material having between 0.5 to 9.0 % by weight of a rare earth metal of the cerium group, between 0.5 to 15 % by weight of tungsten or rhenium or both tungsten and rhenium, between 0.5-10 % by weight of carbon and the remainder of iridium. When not mentioned explicitly, the percentage is based on the total weight of the cathode material.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0018] A more complete appreciation of this invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

[0019] FIG. 1 shows the cathode material used as an electron emission source of a vacuum electron beam apparatus such as a cathode-ray tube;

[0020] FIG. 2 is a graph of operation temperature as a function of the content of carbon in an emitter that is manufactured using the four-element-alloy of cerium, tungsten, carbon and iridium; and

[0021] FIG. 3 is a graph of the lifetime of an emitter as a function of the content of carbon in the emitter that is manufactured using the four-element-alloy of cerium, tungsten, carbon and iridium.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] A cathode material of the present invention improves the electron emission characteristics and the mechanical properties at the same time, by introducing a prescribed amount of carbon, and